



Georgia Department of Public Health



Game Planning for Infectious Diseases

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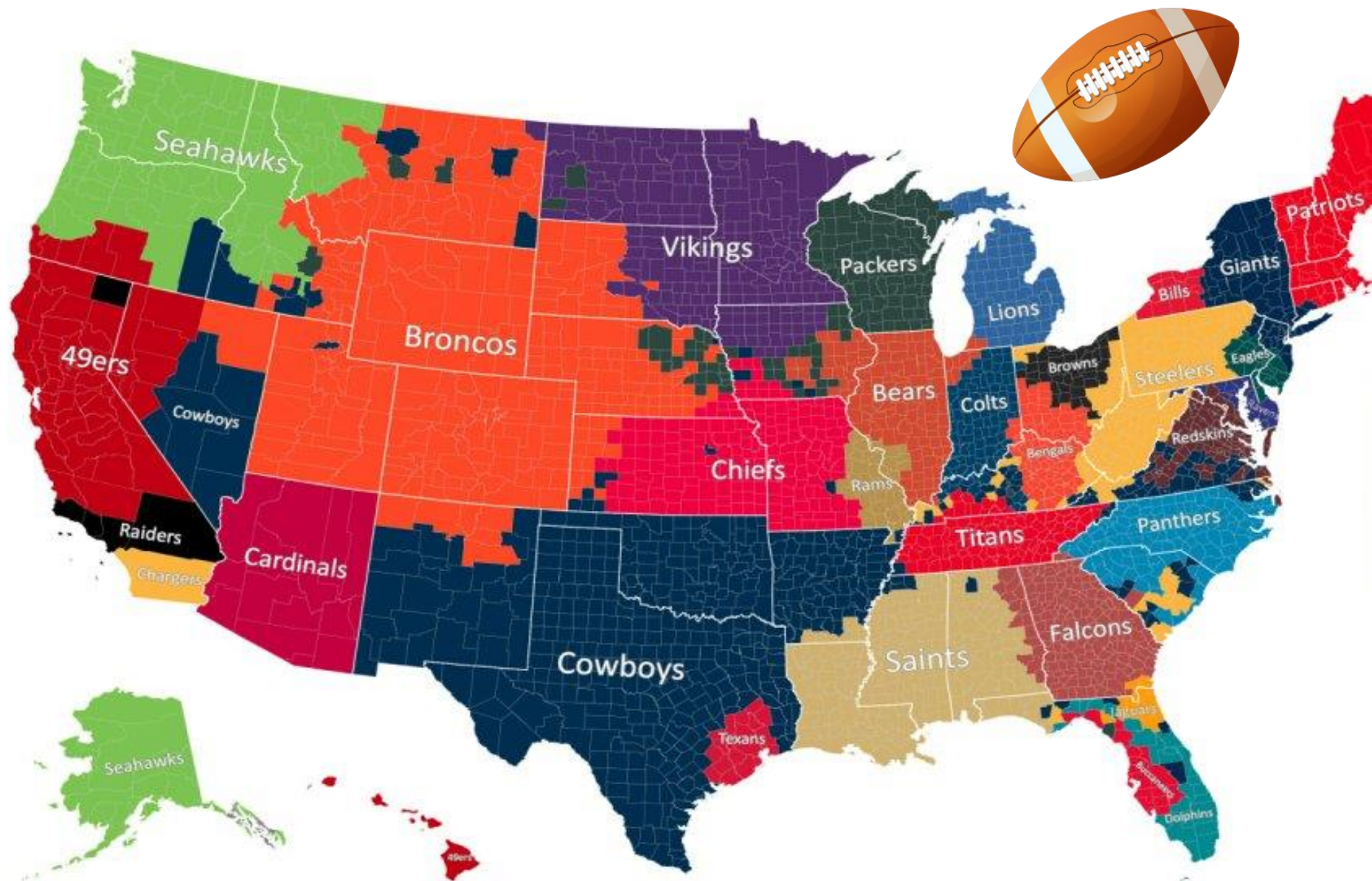
State Epidemiologist

Date: 11/12/2014



We Protect Lives.





NFL Game Planning

- Scouting Reports
- Stats
- Film Study
- Opponents' Tendencies
- Neutralize Strengths
- Exploit Weaknesses

GOAL: WIN!



NFL Game Planning



We Protect Lives.

NFL Game Planning



Infectious Disease Game Planning

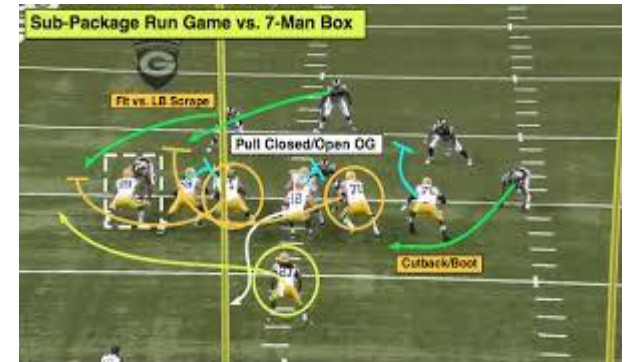
GOAL:

**STOP THE
SPREAD OF INFECTION**

How? PPE, handwashing, vaccines, antibiotic treatment, disinfection, decontamination, food recall, restaurant closure, and others...

Infectious Disease Game Planning: How do we know how to stop transmission?

- Know your Opponent
 - Know the Chain of Infection
 - Understand the Natural History of a Disease
 - Understand the Epidemiology of a Disease
- Exploit Weaknesses



Game Planning

First Step: Tailgating



We Protect Lives.



Infectious Disease Game Planning

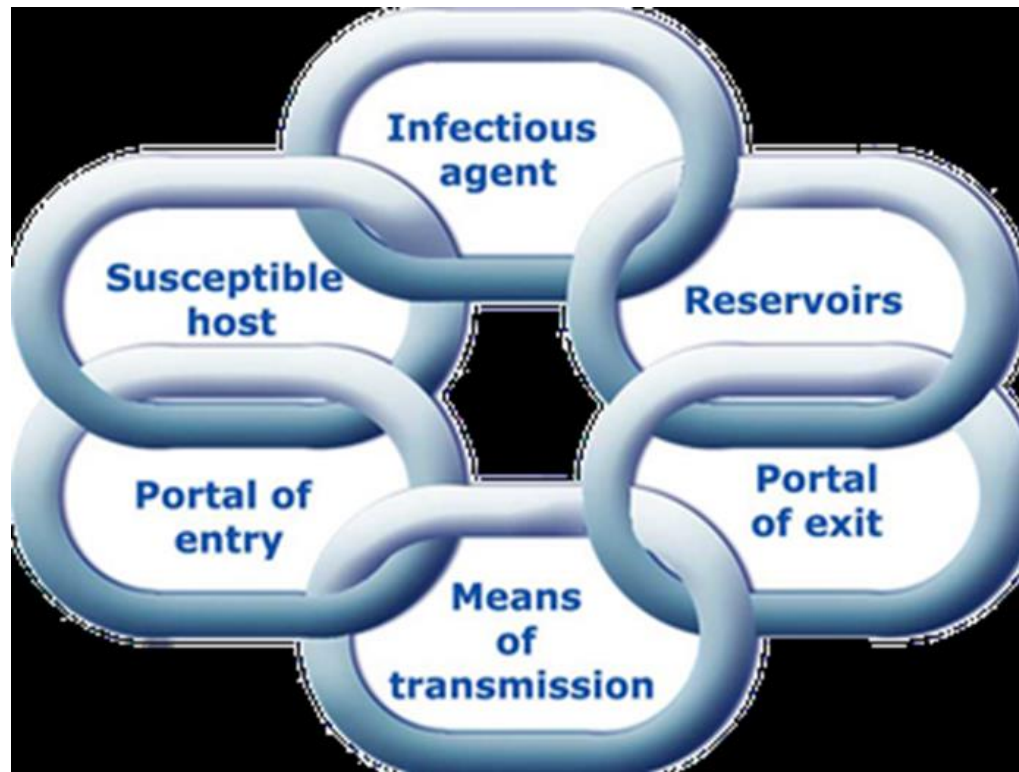
Know Your Opponent: Microbes

- **What is a Microbe?**
 - Our unseen friends and foes
 - Friends produce wine, foes cause human (or animal) infection and illness
 - They are everywhere!
 - Types:
 - Bacteria (*Salmonella*, TB, *E.coli*, MRSA)
 - Viruses (Ebola, norovirus)
 - Yeast and Fungi (*Candida*, *Exserohilum*)
 - Protozoa (*Cyclospora*, *Cryptosporidium*)



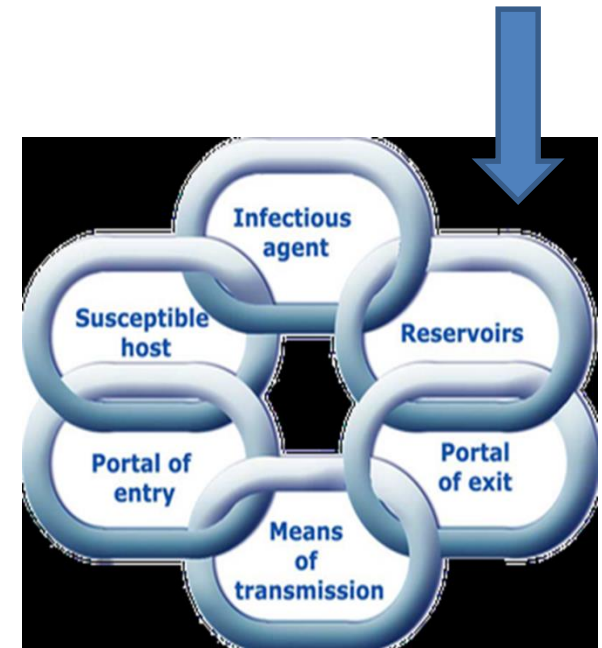
Infectious Disease Game Planning

Know the Chain of Infection



Opponents: Infectious Agents

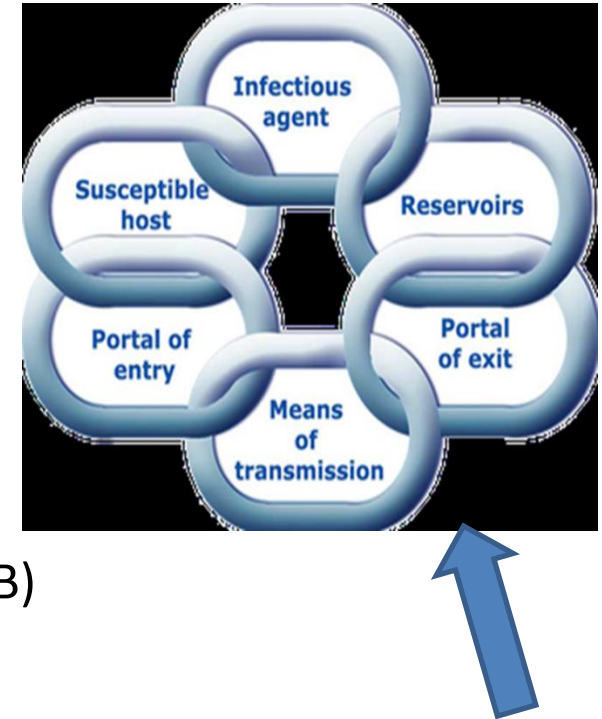
- Found in nature in reservoirs (its natural habitat)
- Reservoirs can be people (pertussis, norovirus), animals (Ebola, *Salmonella*, *E.coli* O157:H7), or inanimate matter like soil (botulism, tetanus, anthrax)
- Microbes survive and reproduce in the reservoir. Sometimes the microbe makes the reservoir sick, sometimes not.

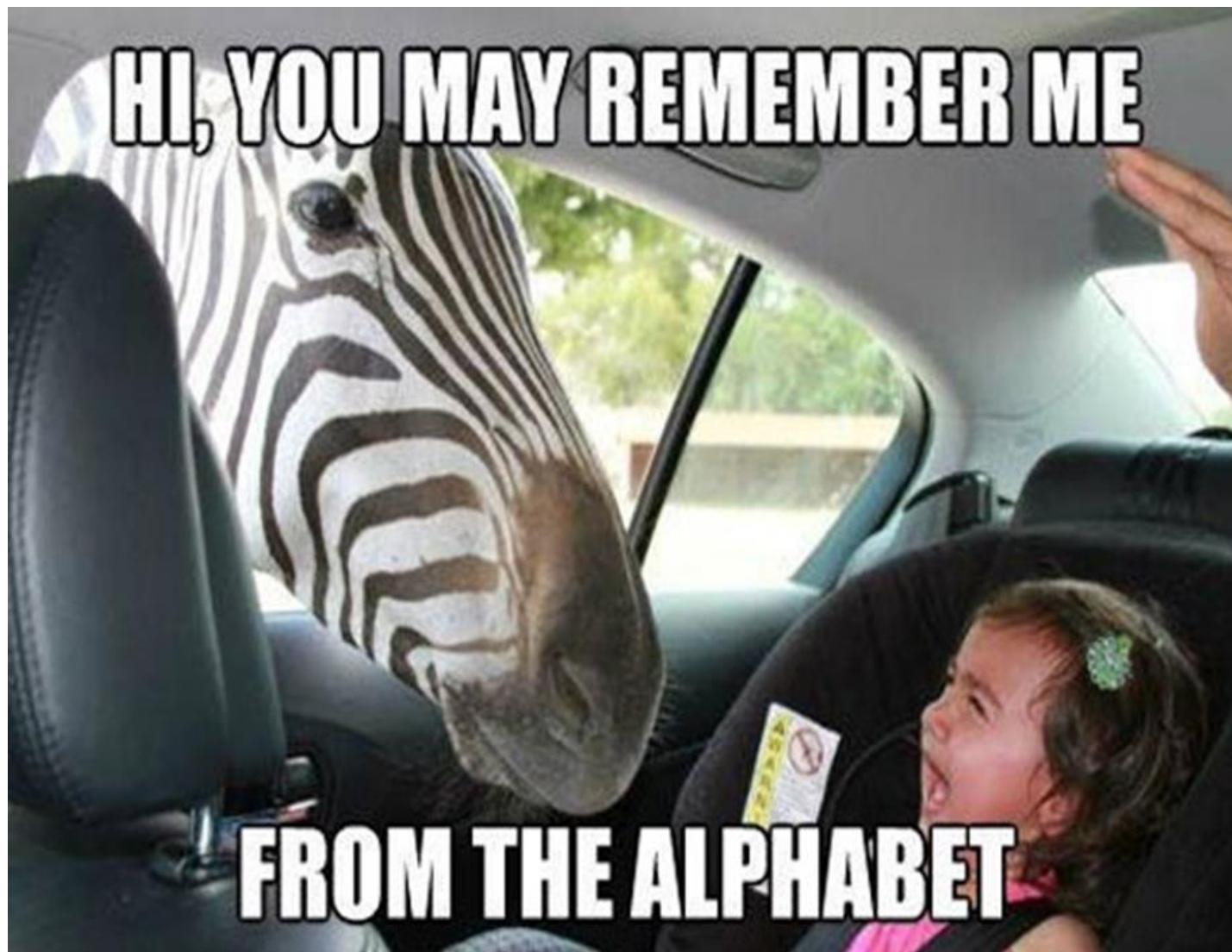


Chain of Infection: How do microbes exit the reservoir and infect someone else?

Modes of Transmission

- Many ways! Many definitions! Many levels!
- Direct vs Indirect
- Vehicles (Food, Fomites)
- Vector (Mosquito, Tick)
- Person-to-Person
- Airborne (Measles, TB), Bloodborne (HIV, Hepatitis B)
Fluid-borne (Ebola), Foodborne (Salmonella),
Waterborne (Cryptosporidium)
- Zoonotic (Ebola, MERS, Rabies, Q fever)



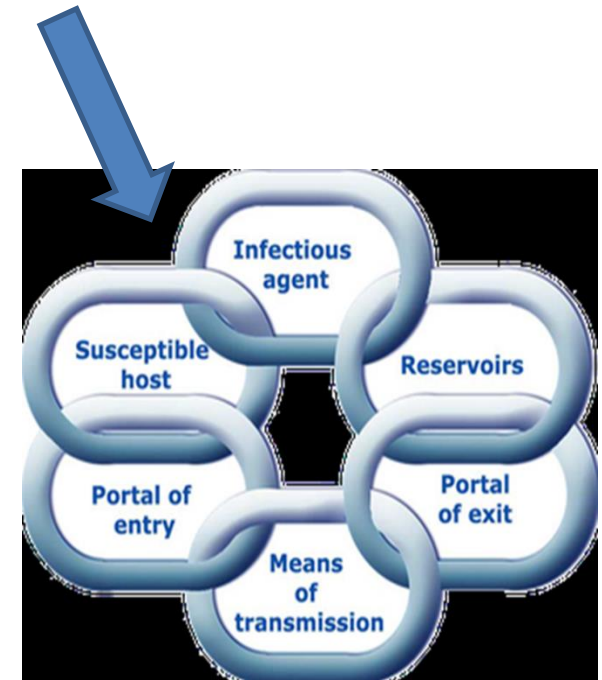


HI, YOU MAY REMEMBER ME

FROM THE ALPHABET

Chain of Infection: How long does it take?

- Incubation period
 - Time from exposure to the microbe to the development of symptoms
- Examples: Flu 1-4 days, Ebola 2-21 days, TB 3-12 weeks, rabies 2 months-1 year
- Contagious or Shedding Period may precede symptoms
- Knowing both **key** to risk assessment and control



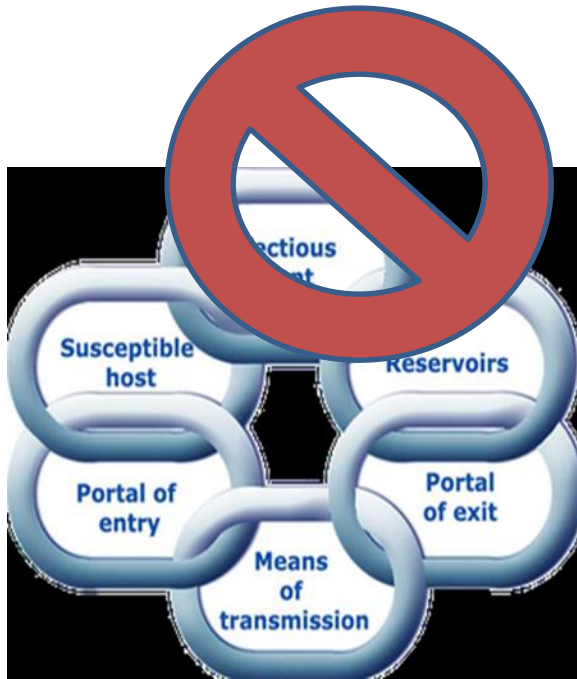
Patterns

(Or, the Epidemiology of our Opponents)



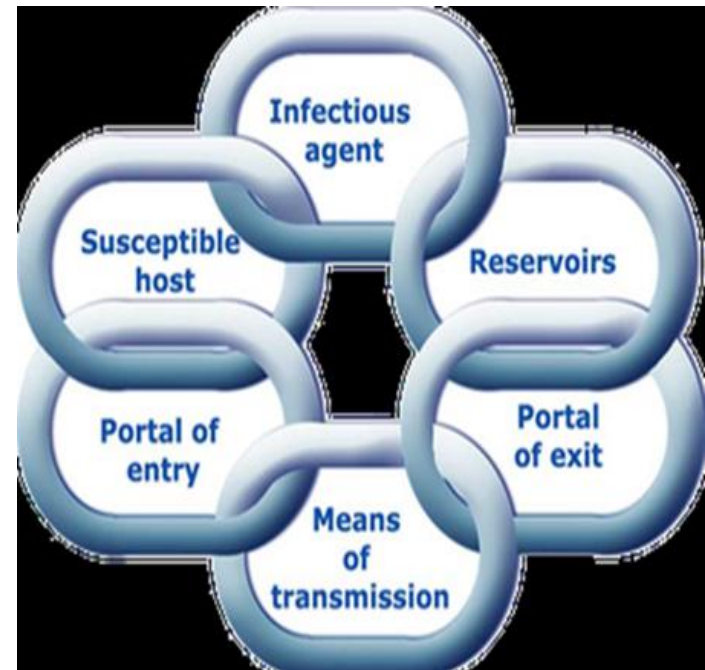
- It's a Small World After All: Emerging infectious diseases are only a plane, boat, ship, or bus ride away
- In 2014, the world shared these infectious diseases: Influenza A H7N9, Chikungunya, MERS, and Ebola
- For foodborne outbreaks: widely distributed contaminated food products; many fresh produce vehicles
- Prevalence of antimicrobial resistance (MRSA, MDR-TB, CRE) and healthcare-associated infections

How Does This Help Us Break the Chain?

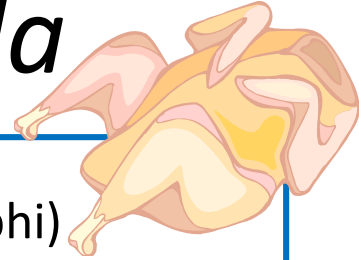


- Control at any link in the chain
- Some easier
- Reservoir harder
- ★ Transmission/entry = PPE, disinfection, handwashing
- ★ Susceptible host = vaccination, isolation, quarantine
- Also focus on epidemiology: early detection among travelers

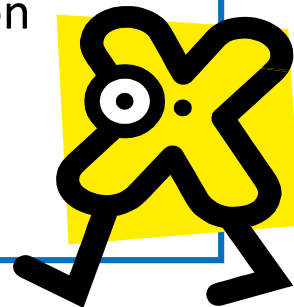
Some Examples of ID Game Plans



Bacterial Agents: *Salmonella*

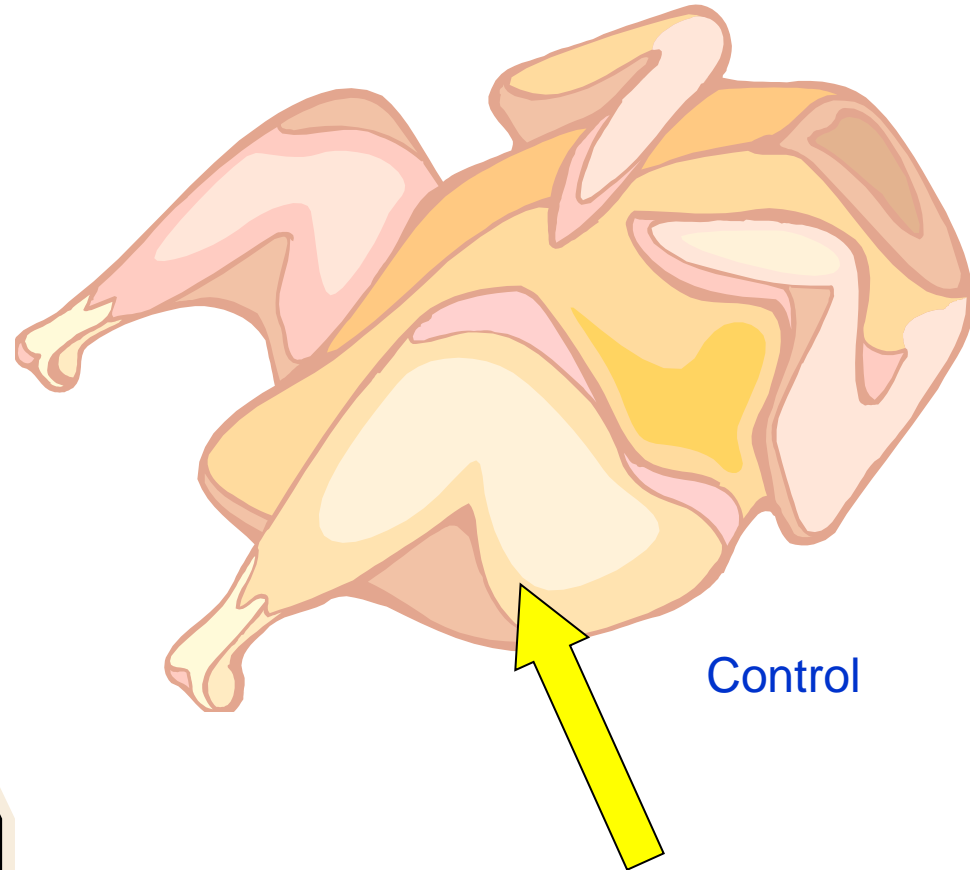
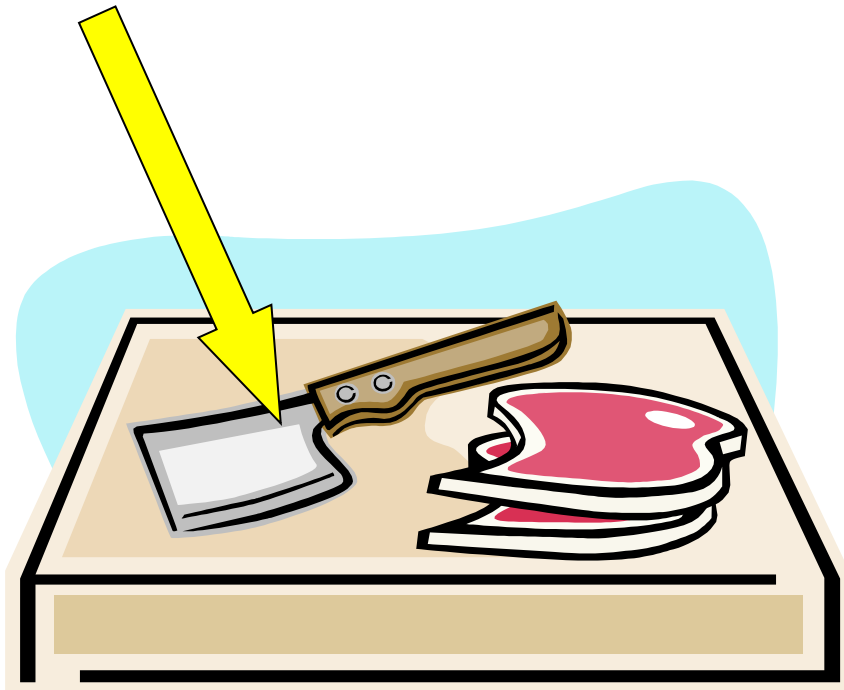


- **Reservoir:** Animals (poultry, cattle, amphibians), Humans (typhi) SEROTYPE-specific
- **Incubation period:** 1-3 days
- **Clinical symptoms:** diarrhea, fever, abdominal cramps, SEVERE, death
- **Epidemiology/patterns:**
 - Restaurants, environment, PFGE clusters
- **Associated vehicles:**
 - Eggs, chicken, fresh produce (melon, tomatoes, sprouts)
- **Spread:** Cross-Contamination from Food to Environment to Person



Bacterial Agents: Salmonella

Control



Viral Agents: MERS Coronavirus

- **Reservoir:** Camels?
- **Incubation period:** 2-14 days
- **Clinical symptoms:** Severe acute respiratory illness, fever, cough, death.
- **Epidemiology/patterns:**
 - Travelers to Middle East (21 countries), healthcare spread, some close contact spread
- **Spread:** Direct contact, droplet?
- **Control:** WHO says people with diabetes, kidney failure, or chronic lung disease and weakened immune systems should:

Avoid contact with camels

Do not drink raw camel milk or raw camel urine

Do not eat undercooked camel meat





We Protect Lives.



Camel Races, Al Sheehaniya - 2008

We Protect Lives.

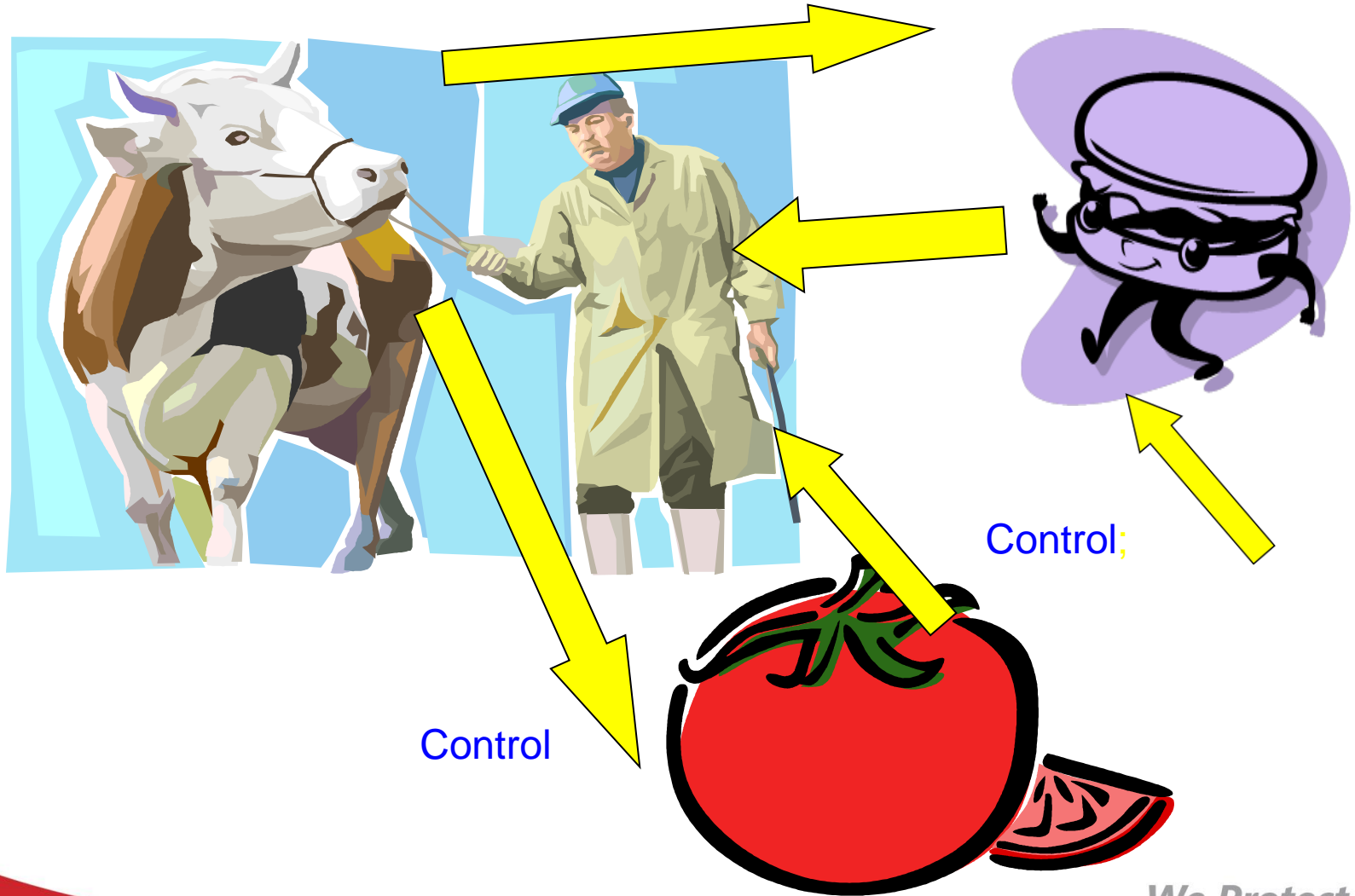
Bacterial Agents: *E.coli* O157:H7

- **Reservoir:** Cattle
- **Incubation period:** 1-8 days
- **Clinical symptoms:** Severe/bloody diarrhea, abdominal pain, vomiting, HUS, death.
- **Epidemiology/patterns:**
 - Restaurants, events, fairs, water/recreational water
- **Associated vehicles:**
 - Undercooked ground beef, fresh produce (apples, sprouts), water
- **Spread:** Cattle feces to beef or to produce via water or manure



Bacterial Agents: *E. coli* O157:H7

Where's The Beef?



EVD Natural History: Transmission

- Ebola is spread through **direct contact**

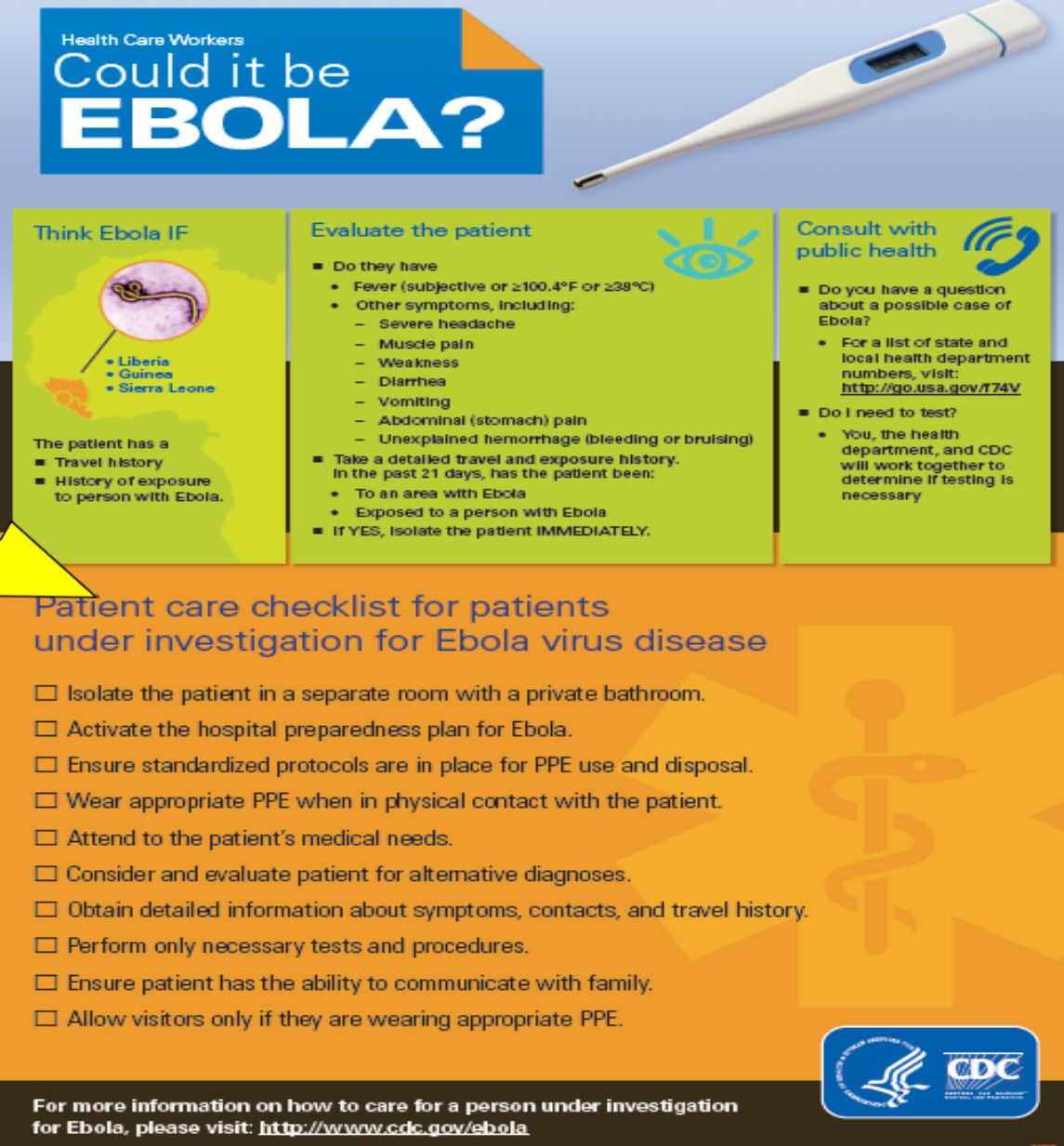
How do you get the Ebola virus?

Direct contact with:

- 1** **Body fluids of a person who is sick with or has died from Ebola.**
(blood, vomit, pee, poop, sweat, semen, spit, other fluids)
- 2** **Objects contaminated with the virus** (needles, medical equipment)
- 3** **Infected animals** (by contact with blood or fluids or infected meat)

Is NOT Airborne

Epi Patterns: Ebola Early Case Recognition



Health Care Workers
Could it be EBOLA?

Think Ebola IF

- Liberia
- Guinea
- Sierra Leone

The patient has a

- Travel history
- History of exposure to person with Ebola.

Evaluate the patient

- Do they have
 - Fever (subjective or $\geq 100.4^{\circ}\text{F}$ or $\geq 38^{\circ}\text{C}$)
 - Other symptoms, including:
 - Severe headache
 - Muscle pain
 - Weakness
 - Diarrhea
 - Vomiting
 - Abdominal (stomach) pain
 - Unexplained hemorrhage (bleeding or bruising)
- Take a detailed travel and exposure history. In the past 21 days, has the patient been:
 - To an area with Ebola
 - Exposed to a person with Ebola
- If YES, isolate the patient IMMEDIATELY.



Consult with public health

- Do you have a question about a possible case of Ebola?
 - For a list of state and local health department numbers, visit: <http://go.usa.gov/r74V>
- Do I need to test?
 - You, the health department, and CDC will work together to determine if testing is necessary

Patient care checklist for patients under investigation for Ebola virus disease

- ☐ Isolate the patient in a separate room with a private bathroom.
- ☐ Activate the hospital preparedness plan for Ebola.
- ☐ Ensure standardized protocols are in place for PPE use and disposal.
- ☐ Wear appropriate PPE when in physical contact with the patient.
- ☐ Attend to the patient's medical needs.
- ☐ Consider and evaluate patient for alternative diagnoses.
- ☐ Obtain detailed information about symptoms, contacts, and travel history.
- ☐ Perform only necessary tests and procedures.
- ☐ Ensure patient has the ability to communicate with family.
- ☐ Allow visitors only if they are wearing appropriate PPE.

For more information on how to care for a person under investigation for Ebola, please visit: <http://www.cdc.gov/ebola>

Toxin Producers: Staphylococcus aureus/MRSA

- **Reservoir:** Humans (nose, throat, boils, piercings); Animals
- **Incubation period:** Varies
- **Clinical symptoms:** Skin infection, boils, purulent, “spider bite”
- **Epi patterns:**
 - Athletic Teams (Tampa Bay Buccaneers), healthcare settings
- **Associated vehicles:** towels, razors, shared equipment, whirlpool
- **Spread:** skin-to-skin direct contact, indirect via vehicles above
- **Control:** Keep wounds covered, handwashing, no sharing



Parting Words

- We rarely mentioned “You Know Who”--“EbolDEMORT”--don’t worry--more to come!
- Etiologic natural history is the foundation of our game plan to defeat our opponent microbes and the keys to their control.
- Infectious disease preparedness has multi-purpose benefits; partnerships always the key to overall improved community health.
- And if something just doesn’t seem right...

How to Contact Epidemiology (24/7)

- Office/Epi On Call (8-5): 404-657-2588
- State Epidemiologist: Cherie L. Drenzek, DVM, MS
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When it Comes to our Microbial Opponents...



We Protect Lives.